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ABSTRACT

This paper reports on the findings of a quantitative study of the educational technology (ET) terminology in the materials of the SITE (Society for Information Technology & Teacher Education) 1999 Conference. Based on these findings, different technologies used in education are described, a formal definition of ET is presented, and its areas are identified. A model of ET is developed, and a list of the most frequent terms is included. (Author/MES)

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Terminology of Educational Technology: A Quantitative Study Based on SITE Conference Proceedings

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Abstract: This paper is a report on the findings of a quantitative study of the Educational Technology (ET) terminology conducted on the materials of SITE 99 Conference. These findings allowed us to single out different technologies used in education, give a formal definition of ET, and identify its areas. A model of ET area is developed. The list of the most frequent terms is presented.

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Introduction

Terminology of a specialty field or an area is like a human body's vital signs: its parameters can reflect its current status and help derive interesting and useful conclusions relating to the field itself. Our quantitative analysis of Educational Technology (ET) terminology is based on the Proceedings of the SITE 99 10th International Conference that took place in San Antonio on February 28 - March 4, 1999 (3). In all we processed 986,619 word forms that yielded 26,972 different words. Some of the findings are presented in this paper.

Technologies in ET

What is ET of today? It is a rapidly developing field embracing a wide range of areas. It covers a number of topics from General Education, Pedagogy, Methodology of Teaching and Learning, Psychology, Social Constructivism, and Information Technologies. Educators now participate in the development of new forms of technology-assisted/supported/mediated/based or related teaching, training, instruction and learning (e.g. Computer-Assisted Learning – CAL, Computer-Assisted Instruction - CAI, Computer-Based Instruction – CBI, Web-based Instruction (WBI), Distance Learning (DL), Asynchronous Learning (AL), Teleteaching, Webtraining and so on).

Technology of today can be simply Educational (ET) or even Advanced-Educational (AET), Teaching, Training, Instructional, plain face-to-face Learning and Distance Learning, Computer (CT), Microcomputer, Supercomputer or just Computerized, Electronic, Digital, Informational (IT), Delivery, Communications and Telecommunications (TT), Active, Interactive, Media, Multimedia and Hypermedia. New terms were coined in Europe for the ET areas: Educational Informatics – the Science of Education based on Informational Technologies, and Telematics – Telecommunications-Based Education.

It is natural that due to the ET rapid development there is some confusion in the use of its terminology: thus, in the general term "technology" different authors include various technologies, devices, their parts, and techniques, e.g.: telecommunications technologies, wireless technologies, telephone communications, teletext, video, computers, CD-ROM, CD-players and even multimedia applications.

At the SITE 99 Conference, 85 various technologies were named (Appendix 1). It is doubtful that all the "technologies" presented by the speakers could be actually called technologies, for instance, "audio tape", "chat", "discussion list", "hand-held", "preservice", "spreadsheet-based", "text-based" and other technologies. I suggest that we differentiate between technologies, like Information, Computer, Telecommunication, Educational Technologies, and techniques, for instance, how to use ET in training preservice teachers, or how to apply spreadsheet in teaching accounting. Here we agree with R. Heinich

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who wrote: "a teaching technique is not technology... some prestigious reports represented seating chart as technology in the classroom. This trivializes technology" [1].

It is necessary to cut a dividing line between technologies, tools, applications and methods. Thus, there is Communication, Instructional and similar technologies, and tools, such as harware tools: CD-ROM, laser disk, audio tape; software tools: word processor, database, teletext, etc., and educational tools: courseware, computer courses and tests, educational computer games, teleconferencing, etc. Then come applications of these tools and techniques, and methods of their use in teaching and learning.

Definition of Educational Technology

What, actually, is ET? It is a set of specific educational tools and their applications in teaching and learning. (NB: It is remarkable that Pedagogy is differentiating between non-machine and machine didactic tools and corresponding technologies.) What tools does ET deal with? – Today in the inventory of pedagogic tools we include technical (hardware), programming (software), didactic (courseware, textbooks and other materials), and methodological (methods and techniques) tools. These tools are used by the people (teachers) and for the people (students) to deliver new information and provide the building and development of a general and particular professional knowledge and skills. Application of ET has for the goal an increase of efficiency of teaching/learning processes, of educational research and of the administration of educational institutions of all levels.

ET can be defined as *a system of technical, programming and didactic tools that are used in education together with human and informational resources to construct individual and group general and specific professional knowledge, to provide meaningful interaction between students, teachers and teaching/learning materials, to mediate communication and collaboration among people involved in the educational process, and to develop particular competencies and skills on the basis of related sciences, technologies and techniques with the goal of improving the efficiency and quality of teaching, training and learning, of pedagogical research and school management* [2].

Areas of ET

To single out the areas of ET, we analyzed the structure of the SITE 99 Conference and found out that there were 24 separate sections at the Conference with 414 papers presented and published in the Proceedings. The most active sections were: Distance Education - 44, Research - 38, Graduate and Inservice - 34. Three telecommunications sections pulled together 35 papers. So, it was clear that the primary topic of the last conference was Telecommunications Technology in education and Distance Learning as a specific form of education based on this particular technology.

Our study allowed us to define 3 major ET areas: Computer, Telecommunications and Non-Computer Technologies, the latter embracing audio, video, audio-visual, TV, projection and other technologies. An important part of ET terminology field is the area of General Educational terminology that relates to all other areas and includes major educational terms associated with ET.

Table 1. Structure of the ET Terminology Field

Terminology Areas	General Education	Computer	Tele-communication	Other Technologies
Number of Terms	536	598	628	160
Total Frequency of Usage	25067	16788	17238	1973

The majority of different terms, as follows from Table 1, are related to the Telecommunications Technology area, though the General Educational terms make up the largest part of the field.

Model of ET Area

We developed a model to describe an ET area that consists of 10 components:

1. Technology Area
2. Hardware 2.1. Types 2.2. Names
3. Software 3.1. Types 3.2. Names
4. Programming 4.1. Tools 4.2. Activities
5. Technological tools (e.g. word processor, database)
6. Processes and operations
7. Forms of technology-using education
8. Educational tools (courseware)
9. Design and development
10. Applications (activities, strategies and techniques)

The Most Frequent Terms

Very significant is the list of 47 most frequent words (with the frequency ≥1000) (Appendix 2). These terms fall into 5 distinct subject groups (some words fall into two groups - e.g. program, information, communication):

1. *Technology*: Technology, computer, software, Web, Internet, online, support, tool, site, system, (computer) program, environment, e-mail, information, communication;
2. *Education*: Education, learning, instruction, teaching, training, course, class, curriculum, process, activities, development, knowledge, skills, information, resource, design, system, level, (course) program, material, communication;
3. *School*: School, university, classroom;
4. *Research*: Research, project, study, data, experience, need;
5. *People*: Student, teacher, faculty, professional, group.

These words allow us to determine the general focus of the conference reports.

Compound Terms

There is a tendency to create new compound terms that denote the level and character of technology use in education. They typically combine an extension with one of the four major terms - technology, computer, Internet and Web. The extensions are varied: accessible, administered, aided, assisted, based, controlled, connected, delivered, driven, enhanced, equipped, enriched, facilitated, focused, generated, infused, integrated, intensive, mediated, networked, oriented, related, rich, supported, and using. The table below shows current preferences in the use of compound words. We used the extensions the frequency of which is 10 or higher.

Table 2. Compound Terms

Term / Extension	Technology-	Computer-	Internet-	Web-	Total
-assisted	-	14	-	-	14
-based	64	74	62	497	697
-enhanced	-	-	-	21	21
-mediated	22	104	-	-	126
-related	34	29	-	-	63
-rich	34	-	-	-	34
-supported	19	13	-	-	32
-using	10	18	-	-	28
Total	183	252	62	518	1015

It is clear that the most frequently used compound words are formed with the terms 'Web', then The most frequent extensions used for that is, certainly, *-based* that points out to the tendency in today's application of technology: if only a few years ago we often used the compound terms CAL, CAI, etc. that demonstrated the supportive role of technology in education, now we mean education *based* on technology. This shift in our perception of technology is very remarkable.

Reduction of Compound Terms

The research also showed that there is a tendency to eliminate a dash in a number of compound words thus reducing them to one word: on-line - online (833-1021), pre-service - preservice (316-847), in-service - inservice (193-323), web-page - webpage (11-34), web-site - website (18-154), though in two words the most use is traditional with the same tendency: e-mail - email (726-357), cd-rom - cdrom (147-14). 'Off-line' was found to be used only in one form.

Neologisms

We recorded quite a few neologisms which is natural for our fast developing field. To mention just a few, we will present a list of terms based on the stem 'tech': techlearning, technofear, technophobia, technophobe, technophile, techno-poetry, techoutcome, techreform, techtrend, techuse, and so on.

Conclusions

Terminology of a science or a special field like ET is a set of laws that regulates the correct use and comprehension of its notions, units, relationships, and reflects its structure. So, the function of terminology is not only to mirror the status quo in the field, but also to organize it, structure, differentiate between its areas and units, standardize and make it exact and, so, efficient. Incorrect terms or their improper use may lead to the misunderstanding or misinterpretation of the real situation in the field.

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1. Heinich, R. The Proper Study of Instructional Technology. *Instructional Technology: Past, Present and Future*. 2nd ed. Ed. By Gary J.Anglin. Libraries Unlimited, Inc., Englewood, CO, 1995, 68-83.

2. Serdiukov, P. (1999) Educational Technology: Definitions, Areas and Terminology. *Proceedings of ED-MEDIA 99 World Conference on educational Media, Multimedia, Hypermedia & telecommunications*. Seattle, WA, USA, June 19-24, 1582-3.

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3. SITE 99 Conference, San Antonio, Texas. SITE (Society for Information Technology & Teacher Education) Conferences 1994-1999. Association for the Advancement of Computing in Education. P.O.Box 2966, Charlottesville, VA 22902. 1999.

Appendix 1. Technologies used by SITE 99 Conference participants

Active	Internet
advanced	Internet-based
all-purpose	knowledge building
alternative	laser disk
applied	learning
assistive	low-end
audio tape	media
audio	multimedia
audio-visual	NASA
CD-ROM	network
chat	networking
classroom	online
CMC	optical fiber
collaborative	presentation
communication	preservice
communications	print
computer	school
computer-based	soft
computer-related	software
computing	software applications
convergent	spreadsheet-based
course	supercomputer
curriculum	supporting
CyberSpace	telecommunications
database	telecomputing
digital	telelearning
discussion list	telematic
distance	text-based
distant	two-way asynchronous
education	two-way interactive
Educational	undergraduate
electronic	video
hand-held	videoconferencing
hard	video disk
hardware	videotape
high	voice-recognition
IBM	VR
Information	Web
infrared	Web-based
Instructional	Web CT
Instructional Systems	wideband channel
interactive	writing
interactive audio/video	

Appendix 2. The most frequent words (f ≥1000)

Student	- 10901	faculty	- 1626
technology	- 9672	instructional	- 1623
teacher	- 9286	software	- 1572
education	- 5204	instruction	- 1423
learning	- 5056	study	- 1417
computer	- 4513	internet	- 1410
course	- 4469	process	- 1391
school	- 3783	class	- 1386
classroom	- 2946	skills	- 1382
teaching	- 2749	curriculum	- 1358
Web	- 2318	tool	- 1311
development	- 2184	support	- 1294
educational	- 2183	site	- 1256
university	- 2118	level	- 1250
information	- 1978	design	- 1241
research	- 1916	knowledge	- 1233
design	- 1911	system	- 1225
online	- 1854	environment	- 1203
experience	- 1827	activity	- 1166
need	- 1792	communication	- 1135
project	- 1778	data	- 1106
training	- 1648	e-mail	- 1083
program	- 1634	professional	- 1073
		material	- 1011